

ABSTRACT

The present invention provides a flowable material container closure assembly having a port tube and a membrane tube. The port tube (I) has a first layer and a second layer, (A) the first layer is a polymer blend of: (1) from about 25% to about 50% by weight of the first layer a first polyolefin selected from the group consisting of polypropylene and polypropylene copolymers, (2) from about 0 to about 50% by weight of the first layer a second polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, and butene ethylene copolymers; (3) from about 0% to about 40% by weight of the first layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (4) from about 0% to about 40% of a first thermoplastic elastomer; and (B) the second layer is disposed coaxially within the first layer and is a second thermoplastic elastomer; and the (II) membrane tube is disposed coaxially within the port tube, the membrane tube has an outer layer, a core layer and an inner layer, the outer layer (A) is a polymer blend of: (1) from about 0% to about 60% by weight of the outer layer of a third polyolefin and (2) from about 40% to about 100% by weight of the outer layer of a second component of a third thermoplastic elastomer, the core layer (B) is attached to the outer layer, the core layer is a polymer blend of: (1) from about 35% to about 100% by weight of the core layer of a fourth thermoplastic elastomer and (2) from about 0% to about 65% by weight of the core layer of a fourth polyolefin; and (C) the inner layer is attached to the core layer on a side opposite of the outer layer, the inner layer is a polymer blend of: (1) from about 25% to about 55% by weight of the inner layer a fifth polyolefin, (2) from about 0 to about 50% by weight of the inner layer a sixth polyolefin selected from the group consisting of ethylene copolymers, ultra-low density polyethylene, polybutene, polybutadiene and butene ethylene copolymers; (3) from about 0% to about 60% by weight of the inner layer a radio frequency susceptible polymer selected from the group consisting of polyamides, ethylene acrylic acid copolymers, ethylene methacrylic acid copolymers, polyimides, polyurethanes, polyesters, polyureas, ethylene vinyl acetate copolymers with a vinyl

acetate comonomer content from 12%-50% by weight of the copolymer, ethylene methyl acrylate copolymers with methyl acrylate comonomer content from 12%-40% by weight of the copolymer, ethylene vinyl alcohol with vinyl alcohol comonomer content from 12%-70% by mole percent of the copolymer; (4) from about 0% to about 40% by weight of the inner layer of a fifth thermoplastic elastomer.

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